APPENDIX A

Engineering Field Trip Report

Pine Flat Reservoir Enlargement

Field Trip Log

Trip Log Number:	12	**Project No.:**	1003032.01180502
Dates:	6/13/02	**Times:**	0900-1130
Site Name:	Pine Flat Dam & Reservoir	**Location:**	Piedra
Prepared By:	DKR/JMH/WAM	**Reviewed By:**	
Date:	6/13/02	**Date:**	

Attendees/Visitors Name	1.1.1.1.1.1.1 Organization/Phone/Email
DKR	MWH, 925.685.6275 x125, david.k.rogers@ei.mwhglobal.com
JMH	MWH, 925.685.6275 x143, james.m.herbert@ei.mhwglobal.com
WAM	MWH, 425.602.4025 x1060, william.a.moler@ei.mwhglobal.com
Frank Fonseca	USCOE, Pine Flat
Roy Proffit	USCOE, Pine Flat

Weather Conditions:

Clear, slight haze, warm (mid 70s), light breeze

Access Route (attach map):

Highway 99, Ventura Av / State highway 180 (E) through Fresno to Centerville, to Trimmer Springs Rd (N), to Pine Flat Rd (E)

Attachments:	Yes	No
Photo Log	✔	
Photos	✔	
Video Log (available)	✔	
Dictation Log (available)	✔	
Topographic Map	✔	

Purpose:

Review proposed raise of existing dam.

Field Observations:

Existing Structures/Cultural Features:

Pine Flat Dam is a concrete gravity structure completed in 1954. The existing dam crest is 429 feet high (el. 970), 32 feet wide and 1,820 feet long. The gated spillway has a gross length of 292 feet, a net length of 252 ft, and a crest elevation of 916.5 ft. There are six spillway tainter gates that each measure 42 ft by 36 ft. Pine Flat Reservoir covers 5,970 acres at a gross pool elevation of 951.5 and has a maximum storage capacity of 1,000,000 acre-feet. The Pine Flat Dam drainage area covers ~1,545 square miles (USCOE, 1976).

A 165 MW power plant (URS, 2000) operated by Kings River Conservation District (KRCD) is located at the right side, downstream base of the dam. A PG&E power plant and penstock (Kings Power Plant) is located on the upper margin of Pine Flat Reservoir.

What little development that has occurred on the reservoir has taken place on the north shore. Two marinas, Trimmer and Lakeridge, and four campgrounds, Island Park, Kirch Flat, a group site, and unnamed site are all along the north shore. Campgrounds are also found a short distance downstream of Pine Flat Dam. The land within the embankments is used for agriculture. A citrus grove was observed in the southeast portion of the reservoir and the rest appeared to be used as grazeland.

Right of Way/Access Restrictions:

Public roads lead to the Pine Flat Dam and Reservoir area.

Overhead/Buried Utilities:

Overhead / underground utilities lead to and service the dam and the area below the dam. A number of high voltage transmission lines traverse the area. One line traverses the ridge south of the dam and reservoir, others cross the Kings River just downstream of the dam and downstream of Piedra, and another crosses the central portion of the reservoir, and one exits southward from the KRCD power plant and the PG&E power plant.

Description of Proposed Structures (attached a field sketch or sketch on a topo map):

URS indicated that 45,000 acre-feet of reservoir capacity would be obtained by adding a 7 ft. parapet to the existing dam crest. URS assumed that the 7-ft parapet option was the maximum amount the current dam could be raised by adding solely to the dam crest. Any further raise would dramatically increase construction cost (URS, 2000).

Alternatives evaluated previously included 15- and 20-ft increases in the gross pool elevation. A 15-ft gross pool raise, could be accomplished by a 7-ft dam raise, and would result in an additional 92,772 acre-feet of storage capacity. This option could

be accomplished without incurring major cost of additional concrete on the downstream dam face (USCOE, 1989).

A 20-ft gross pool raise, could be accomplished through a 12-ft dam raise, but would require extensive concrete on the downstream dam face, flood protecting of the upstream PG&E power plant. This option would result in an additional 124,380 acre-feet (USCOE, 1989).

Description of Appurtenant Features (spillways, tunnels, pumping plants, flood routing/coffer dams/dewatering during construction, outlet works, switch yards, transformer yards, transmission lines, conveyance pipelines/canals, access roads, security, operation/maintenance):

In the 15-ft gross pool raise, the ogee spillway would need reshaping, piers would be enlarged, new (42 ft by 54 ft) tainter gates would be installed, PG&E power plant would be raised (16.5 ft), 3½-miles of Trimmer Springs Rd and 3 bridges would require relocation, and recreation facilities would require relocation (USCOE, 1989).

The 20-ft gross pool raise would require similar modifications as the 15-ft raise. However, the tainter gates would be larger (42 ft by 59 ft), the PG&E power plant would be raised higher (21.5 ft total), reinforced concrete with pre-stressed tendons would be added to the downstream dam face, and the power intake frame at Pine Flat Dam would need to be raised (USCOE, 1989).

Briefly Describe Geologic/Geotechnical Site Conditions:

Pine Flat Reservoir is located near the boundary of the Sierra Nevada foothills and the Great Valley. The state geologic map shows that the southern perimeter of the lower main portion of the reservoir is bordered by pre-Cenozoic granitics, while Mesozoic granitic borders the upper reaches of the reservoir. The northern perimeter exposes a more complex set of geologic units. The lower portion of the reservoir is bordered by pre-Cenozoic meta-volcanic rocks, Mesozoic granitics, Mesozoic basic intrusive and ultrabasic rocks, and pre-Cretaceous meta-sedimentary rocks (CDMG, 1965).

At Pine Flat Dam, the right abutment is founded in the pre-Cenozoic meta-volcanic rocks, while the left abutment is founded in the pre-Cenozoic granitics (CDMG, 1965). In the power plant area, the bedrock consists of hard metamorphic (meta-volcanic) rock of jointed amphibotlite with scattered thin seams of calcite, quartz, and lesser gypsum and weathered bedrock (USCOE, 1989).

As with most sites in the region, studies indicate that there are no faults in the area capable of producing ground motions greater than those generated by four known regional sources that include the San Andreas fault system, the Sierra Frontal fault system, the White Wolf fault, and the Garlock fault (USCOE, 1990).

Location/Description of Nearest Borrow Areas (attach map or show on topo map):

Previous investigations by the USBR and USCOE identified suitable concrete aggregate along Kings River and lower valley of Mill Creek (IECO, 1974).

According to Mr. Fonseca of the Pine Flat USCOE office, there are plans for a possible new granite quarry at Jesse Mountain.

Location/Description of Equipment/Material Staging and Lay Down Areas (attach map or show on topo map):

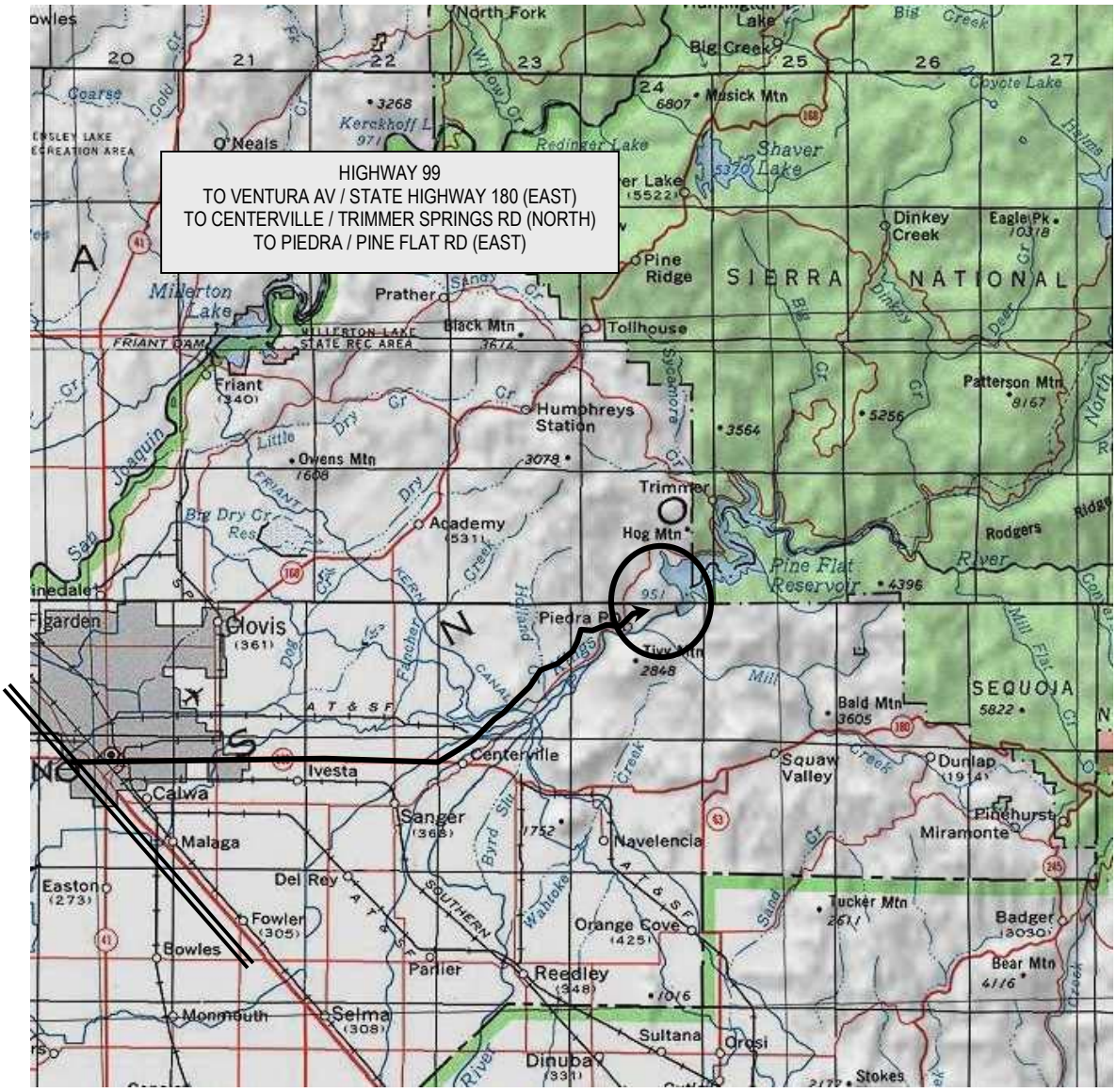
Potential staging and laydown areas are present within the parking area on the downstream side of the left abutment and at the bottom of the dam crest access road, near the USCOE office.

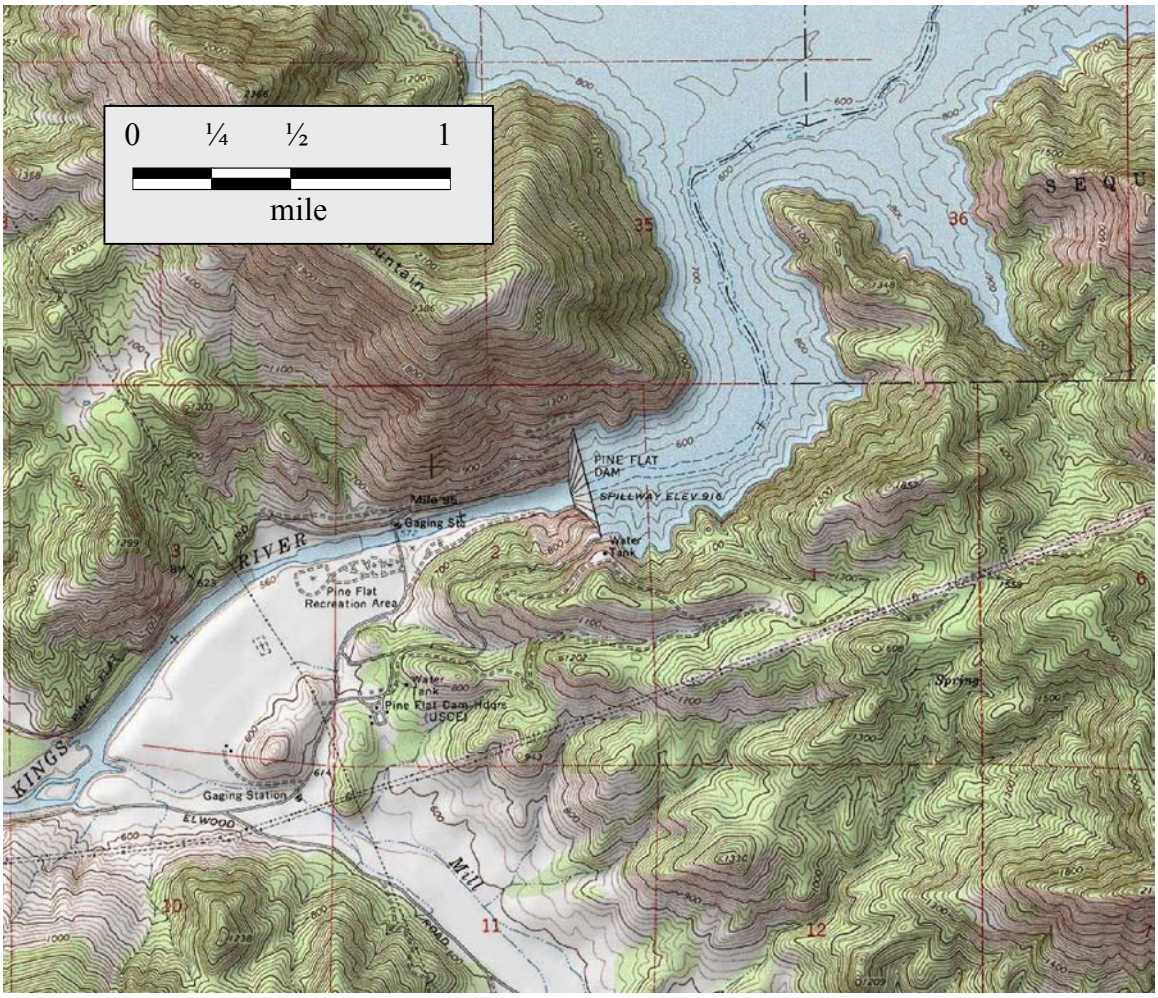
Identification of Environmental Sensitive Areas (wetlands, springs, rivers, streams, endangered/threatened species habitats, etc.):

A riparian habitat upstream of the upper end of the reservoir would be affected with a dam raise, as would slight amounts of oak woodland on the left abutment. The right abutment is primarily cattle grazeland grass.

Description of Mining or Other Anthropologic Activities:

None were noted.


HIGHWAY 99
TO VENTURA AV / STATE HIGHWAY 180 (EAST)
TO CENTERVILLE / TRIMMER SPRINGS RD (NORTH)
TO PIEDRA / PINE FLAT RD (EAST)
North Fork
Big Creek
Musick Mtn
Coyote Lake
O'Neals
Redinger Lake
Shaver Lake
Dinkey Creek
Eagle Pk
Pine Ridge
SIERRA NATIONAL
Millerton Lake
Prather
Black Mtn
Tollhouse
FRIANT DAM
MILLERTON LAKE STATE REC AREA
Friant
Humphreys Station
Patterson Mtn
Owens Mtn
Trimmer
Hog Mtn
Academy
Rodgers
Pine Flat Reservoir
Piedra
Clovis
Tivy Mtn
SEQUOIA
Bald Mtn
Centerville
Ivesta
Squaw Valley
Dunlap
Calwa
Sanger
Navelencia
Pinehurst
Miramonte
Malaga
Del Rey
Easton
Fowler
Tucker Mtn
Badger
Orange Cove
Bowles
Parlier
Reedley
Bear Mtn
Monmouth
Selma
Sultana
Orosi
Dinuba
Stokes


0 ¼ ½ 1
mile
PINE FLAT DAM
SPILLWAY ELEV 918
Gaging Sta
Water Tank
Pine Flat Recreation Area
KINGS RIVER
Water Tank
Pine Flat Dam Hdqrs (USCE)
Gaging Station
ELWOOD
Mill
Spring
SEQU
35
36
1
2
3
11
12
20